996.841

PATENT SPECIFICATION

DRAWINGS ATTACHED

996.841

Date of Application and filing Complete Specification Sept. 18, 1963.

No. 36795/63.

Application made in Germany (No. D39946 XII/47f) on Sept. 29, 1962.

Complete Specification Published June 30, 1965.

Index at acceptance: —F1 P(4, 10X, 18A); F2 VB

Int. Cl.:—F 03 c

COMPLETE SPECIFICATION

Improvements relating to means for Damping Pressure Shocks in Hydraulic Systems

We, DAIMLER-BENZ AKTIENGESELLSCHAFT, of Stuttgart-Untertürkheim, Germany, a Company organised under the laws of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns improvements relating to means for damping pressure shocks in ducts of hydraulic systems installed in motor vehicles, comprising a pipe or other duct communicating between the delivery of a pump, especially a piston pump, and a pressure accumulator to which hydraulic operating and/or control devices are connected.

Piston pumps for delivering a pressure medium to hydraulic devices produce pressure shocks which are propagated in the medium and in the pipes and which, for example when a pipe is located against a wall of a vehicle body, may produce troublesome noise in the latter.

Interference devices have already been proposed for damping vibrations produced by intermittent delivery of the medium. However, the provision of dead spaces in the pipes effects damping of predetermined natural frequencies only. In addition, such damping results in loss of energy and increased expense for the provision of the damping devices. Finally, because of lack of space, such devices cannot always be accommodated in a motor vehicle.

The pressure accumulator themselves have also been used for damping pressure shocks, in which case the pipe between the accumulator and the pump had to be kept as short as possible and could not be disposed against a wall of a vehicle body. As, however, the lines leading to the operating devices had to be connected directly to the end of the pipe which adjoins the accumulator and, because of their length, these lines had to be secured to a wall, the pressure shocks were transmitted to the said lines and still gave rise to considerable noise. It is an object of the present invention to provide means by which the shocks are damped and noise produced by the shocks is reduced or eliminated.

According to the invention, a hydraulic system in a motor vehicle includes a first duct communicating between the delivery of a pump and a pressure accumulator, a second duct communicating between the said accumulator and hydraulic operating and/or control devices, and means for damping pressure shocks comprising an ante-chamber which forms a passage extending straight through between the said first duct and the opening to the accumulator and having a cross-section larger than those of the first and second ducts. Such an arrangement is applicable with especial advantage in the case of a system, installed on a motor vehicle, in which the pump is a piston pump.

Preferably, the cross-section of the mouth of the first duct opening into the ante-chamber is larger than that of the mouth of the second duct opening into the ante-chamber. Depending upon the differences in cross-section, pressure shocks produced by a piston pump can be reduced to a desired extent.

The ante-chamber may be provided in an intermediate union piece attached directly to the accumulator and having a number of branches corresponding to the number of connections to be made to the said piece. The cross-section of the branch communicating with the accumulator may be equal to that of the mouth of the first duct opening into the ante-chamber. The cross-section of the said branch may be equal to that of the

[Price 4s. 6d.]

ante-chamber, which permits of a simple inexpensive union piece.

Due to the ante-chamber between the end of the first duct and the accumulator on the one hand and the second duct on the other hand, and also due to the different cross-sections in the union piece, smoothing of the shocks or vibrations in the pressure medium is achieved, so that the said medium flows into the second duct without serious shocks and produces little or no noise at the walls of the vehicle body.

Embodiments of the invention by way of example are illustrated in the accompanying drawing, in which:

Figure 1 shows one form of damping means in conjunction with a pump and pressure accumulator for a system on a motor vehicle, partly in section, and

Figure 2 similarly shows another form of damping means.

In Figure 1, 10 designates a piston pump and 11 a pressure accumulator. A pipe 12 connects the pump 10 through an intermediate union piece 13 to the accumulator 11. In addition to a branch 13^{I} for the pipe 12, which is relatively short and is not attached to a wall of the vehicle body, and a branch 13^{II} screwed into the body of the accumulator 11, the union piece 13 has a branch 13^{III} connected to a pipe which leads to hydraulic operating and/or control devices and which can be attached to walls of the body. The bores of the branches 13^{I} to 13^{III} open into an ante-chamber 14 which immediately precedes the accumulator 11 and whose internal diameter D_3 is larger than the internal diameter D_2 of the branch 13^{I}, which is, as far as possible, the same as that of the pipe 12. The said diameter D_2 is larger than the internal diameter D_1 of the branch 13^{II}, which may be the same as the diameter of the pipe leading to the operating and/or control devices. The diameter of the branch 13^{II} is equal to the diameter D_3. To avoid losses due to throttling effects, the pipe leading to the said devices may have a diameter larger than the diameter D_1 of the branch 13^{III}.

The arrangement illustrated in Figure 2, comprising a union piece 23 with branches 23^{I}, 23^{II} and 23^{III} and ante-chamber 24, differs solely in that the diameter of the branch 23^{II} connected to the accumulator 11 is equal to the diameter D_3 of the chamber 24.

Due to the different diameters D_1, D_2, D_3 of the said branches and ante-chamber, 14 or 24, pressure shocks can be damped to an extent dependent upon the magnitudes of the difference in diameter. Even when relatively long pipes leading to operating and/or control devices bear against walls of the vehicle body, little or no noise is transmitted thereto.

WHAT WE CLAIM IS:—

1. An hydraulic system in a motor vehicle, including a first duct communicating between the delivery of a pump and a pressure accumulator, a second duct communicating between the said accumulator and hydraulic operating and/or control devices, and means for damping pressure shocks comprising an ante-chamber which forms a passage extending straight through between the said first duct and the opening to the accumulator and having a cross-section larger than those of the first and second ducts.

2. A system according to claim 1, wherein the cross-section of the mouth of the first duct opening into the ante-chamber is larger than that of the mouth of the second duct opening into the ante-chamber.

3. A system according to claim 1 or 2, wherein the ante-chamber is provided in an intermediate union piece attached directly to the accumulator and having a number of branches corresponding to the number of connections to be made to the said piece.

4. A system according to claim 3, wherein the cross-section of the branch communicating with the accumulator is equal to that of the mouth of the first duct opening into the ante-chamber.

5. A system according to claim 3, wherein the cross-section of the branch communicating with the accumulator is equal to that of the ante-chamber.

6. An hydraulic system with means for damping pressure shocks substantially as hereinbefore described with reference to Figure 1 or Figure 2 of the accompanying drawing.

JENSEN & SON,
Agents for the Applicants,
77, Chancery Lane,
London, W.C.2,
Chartered Patent Agents.

Leamington Spa: Printed for Her Majesty's Stationery Office by the Courier Press.—1965.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

996841 COMPLETE SPECIFICATION
1 SHEET This drawing is a reproduction of the Original on a reduced scale

Fig.1

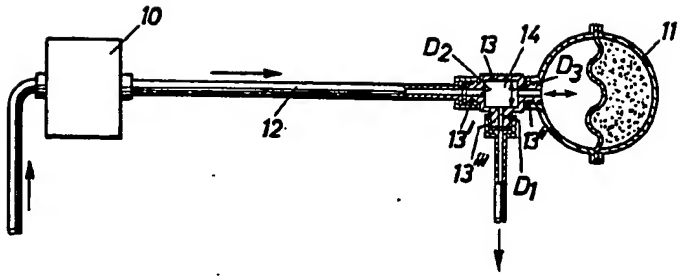

Fig.2